

# **EXHIBIT 2**

1 - VOLUME M -  
2 IN THE UNITED STATES DISTRICT COURT  
3 IN AND FOR THE DISTRICT OF DELAWARE  
4  
5 CORDIS CORPORATION, : CIVIL ACTION  
6 :  
7 Plaintiff :  
8 :  
9 vs. :  
10 :  
11 MEDTRONIC AVE, INC., et al. : NO. 97-550 (SLR)  
12 :  
13 BOSTON SCIENTIFIC : CIVIL ACTION  
14 CORPORATION, et al., :  
15 :  
16 Plaintiffs :  
17 :  
18 vs. :  
19 :  
20 ETHICON, INC., et al., :  
21 :  
22 Defendants : NO. 98-19 (SLR)  
23 :  
24 CORDIS CORPORATION, : CIVIL ACTION  
25 :  
Plaintiff :  
vs. :  
BOSTON SCIENTIFIC :  
CORPORATION, et al., :  
Defendants : NO. 98-197 (SLR)  
Wilmington, Delaware  
Tuesday, December 12, 2000  
9:07 o'clock, a.m.  
BEFORE: HONORABLE SUE L. ROBINSON, Chief Judge, and a jury  
Official Court Reporters

3202

1           The second reason I wanted to introduce Dr.  
2 Collins, because he's going to be examined by my  
3 colleague and friend, Mike Timmons, who you've seen in the  
4 courtroom. Mike has been here every day. He has been  
5 running equipment. He knows this case, I can say, without  
6 fear of contradiction, better than any human being on  
7 earth. And he's going to examine the witness.

8 MR. TIMMONS: Thank you.

9

10 ... JOHN M. COLLINS, having been  
11 previously duly sworn as a witness,  
12 was recalled and testified further as  
13 follows ...  
14 MR. TIMMONS: May I proceed, your Honor?  
15 THE COURT: Yes, you may, Mr. Timmons.  
16 MR. TIMMONS: Ladies and gentlemen of the jury.  
17 Thank you, Mr. Diskant, first off.

18 DIRECT EXAMINATION

19 BY MR. TIMMONS:

20 Q. Welcome back, Dr. Collins.

21 A. Thank you very much.

22 Q. We're going to talk today about one particular issue,  
23 whether or not the ACS stents infringe Claim 23 of the  
24 '762 patent.

25 Are you familiar with the stents that ACS has

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1 sold in the United States?

2 A. Yes, I am.

3 Q. And what are they?

4 A. There are three brand names: A Multi-Link Duet and  
5 Tristar.

6 Q. And what did you do in order to familiarize yourself  
7 with those stents?

8 A. Basically reviewed a lot of information, as well as  
9 looking at stents. Looked at engineering drawings.  
10 Looked at pictures. Read a lot of documentation, both  
11 ACS documentation and other publications.

12 Q. Did you see photos of each of those three stents?

13 A. Certainly saw photos of all the stents, yes.

14 Q. In order to save some time, I've put some photos in  
15 the orange book next to you. I would first like to  
16 direct your attention to Plaintiff's Exhibit 3254-A and B.

17 Can you tell me what those are?

18 A. This is a photo, there were actually two photos, one  
19 of more or less the entire stent. The other is a closeup  
20 of the Multi-Link.

21 MR. TIMMONS: I would offer 3254-A and B into  
22 evidence.

23 MR. BRENEISEN: No objection.

24 THE COURT: So marked.

25 \*\*\* (Plaintiff's Exhibits No. 3254-A and 3254-B

3204

1 were received into evidence.)

2 BY MR. TIMMONS:

3 Q. 3254-A. What is that?

4 A. I believe that's -- that is the Multi-Link.

5 Q. And B?

6 A. And B is the -- I'm looking at 3254-B?

7 Q. B.

8 A. Is the -- that's up there. That's a closeup picture  
9 of the Multi-Link.

10 Q. Okay. We'll get back to the detail shortly, but let's  
11 turn now to the next photograph we have, which is 3253-A  
12 and B. Tell me what that is?

13 A. That's a similar combination of pictures of the --  
14 a full stent and then a closeup of the stent. In this  
15 case, it's of a Duet stent.

16 MR. TIMMONS: I offer 3253-A and B.

17 MR. BRENEISEN: No objection, your Honor.

18 THE COURT: Thank you.

19 BY MR. TIMMONS:

20 Q. Did you explain what this is a picture of?

21 A. Of the Duet stent. More or less, the entire  
22 stent.

23 Q. And B?

24 A. And B is a closeup of one portion of the stent.

25 Q. And, again, we'll get back to the details. Let's

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1 look at 3252-A and B.

2 A. Mm-hmm. And this is, again, a similar combination.

3 In this case, 3252-B is of the entire stent and 3252-A is

4 a closeup of the entire stent for a Tristar stent.

5 MR. TIMMONS: I offer 3252-A and B.

6 MR. BRENEISEN: No objection, your Honor.

7 THE COURT: Thank you.

8 \*\*\* (Plaintiff's Exhibits No. 3252-A and 3252-B

9 were received into evidence.)

10 BY MR. TIMMONS:

11 Q. Explain to the jury what 3252-B is, please?

12 A. That's a picture of the entire Tristar stent.

13 Q. And A?

14 A. And A is a picture of a blowup of a portion of that  
15 stent.

16 Q. One more thing that is -- let's show you first and  
17 I will offer it into evidence.

18 MR. TIMMONS: May I approach, your Honor?

19 THE COURT: Yes, you may.

20 (Mr. Timmons handed an exhibit to the  
21 witness.)

22 BY MR. TIMMONS:

23 Q. Plaintiff's Exhibit 2230. Could you tell me what  
24 that is, please?

25 A. This is a Multi-Link Duet stent.

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1 Q. Have you seen Duet stents before?

2 A. Yes, I have.

3 MR. TIMMONS: I offer into evidence PX-2230.

4 MR. BRENEISEN: No objection.

5 THE COURT: Thank you.

6 \*\*\* (Plaintiff's Exhibit No. 2230 was received  
7 into evidence.)

8 BY MR. TIMMONS:

9 Q. Dr. Collins, for the purposes of your infringement  
10 analysis, is there any difference between the Multi-Link,  
11 Duet and Tristar stents?

12 A. No. Not for purposes of infringement analysis.

13 Q. And does BSC's expert agree with that?

14 A. Yes, he does.

15 Q. I'd like to direct your attention to PX-276, which  
16 is the Handbook of Coronary Stents. I think it's already  
17 in evidence. And Page 5, there's a discussion of the  
18 Tristar stent. What is ACS -- what does ACS say about  
19 the geometry of the Duet and Tristar stents?

20 A. Well, under the section of stent design, it says --  
21 this is a description of the Tristar stent. And if you  
22 look at the characterization of the stent design, it's  
23 made in the exact corrugated ring pattern as the ACS  
24 Multi-Link Duet. So basically the stent, the metal  
25 pattern for the Duet and for the Tristar are identical.

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1 Q. And let's take a look at that geometry now. Back  
2 a couple pages. Page 3 of the orange book.

3 Can you tell me what this is, generally?

4 A. Sure. Again, this -- there's a chapter in this book,  
5 the Handbook of Coronary Stents, which describes a number  
6 of stents, and this one chapter describes the Tristar.  
7 And here in the first page is an overall description of  
8 the Tristar is a balloon expandable stent made of a  
9 corrugated ring design with multiple rings connected with  
10 multiple links.

11 MR. TIMMONS: Can we do a split-screen with  
12 3252-A, please?

13 BY MR. TIMMONS:

14 Q. You've already said that the Tristar is a balloon  
15 expandable stent. Do you see where it says corrugated  
16 ring design?

17 A. Yes.

18 Q. Would you explain to me what the corrugated ring  
19 design is?

20 A. Yes. Corrugated ring design is exactly the same  
21 thing -- it can be called a Palmaz ring. Corrugated ring,  
22 Palmaz ring. It's marketing speak for the same thing.

23 And you look at, for example, take a look at  
24 this area here, which is one of the corrugated rings.

25 And what you will see, it's a Palmaz ring with a corrug --



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1 with the corrugations being the serpentine pattern we  
2 talked about before with the Palmaz ring.

3 Q. Does the corrugated ring of the Tristar stent work  
4 the same way as the Palmaz ring in the '762 patent?

5 A. Exactly the same way, yes.

6 Q. Underneath corrugated ring it says multiple rings  
7 connected with multiple links. Using the Tristar, would  
8 you explain what that is?

9 A. Sure. As I was describing before, with a Palmaz  
10 ring, the way you can make a stent longer or shorter is by  
11 using more of the Palmaz rings. So here, we just see, you  
12 know, one, two, three, four, five, and you can have as  
13 many or as few as you wanted.

14 So that's what's meant by multiple rings in  
15 the stent here. And they're connected with multiple links.

16 In this case, you can see a link here, which  
17 connects this ring to that ring and you can't see it, but  
18 on the back side, there's another ring -- another connector.  
19 So there's more than one connector that connects each ring  
20 to its neighboring ring.

21 Q. And is there any difference between the geometry  
22 you see in the Tristar with the connections and the NIR  
23 stent connections that we learned about in the liability  
24 phase of this case?

25 A. Yes. Absolutely. And the differences stem from --

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1 probably the easiest way to look at the differences is  
2 the fact that, if you remember when we were describing  
3 the NIR, we were talking about them as being out of phase,  
4 and that meant when you had the serpentines, that the  
5 peaks of the serpentines were aligned, where here, if you  
6 look at this pattern, you will notice that this part of  
7 the -- this slot (indicating) within the ring is in the  
8 same position as the one right next to it. So this is  
9 in phase.

10 So as a result, the end of one of the -- the  
11 ring portions is lined up with the -- the peak. One side,  
12 it's lined up with a valley of the other.

13 So if you look at how you connect one to the  
14 other, the distance is much, much longer, so the connector  
15 is much longer than the connector in the NIR stent. And  
16 it connects the peak of one serpentine ring to the valley,  
17 if you will, of the other serpentine ring.

18 Q. Does the connector have a link in the Tristar have  
19 any effect on how the corrugated ring expands?

20 A. No, not at all. The way this expands is driven by  
21 the Palmaz ring, or the corrugated ring. That's what  
22 controls the expansion, as we talked about before. And  
23 the connector basically goes along for the ride.

24 Q. Can we focus in on the lower right-hand corner  
25 portion of the orange one, please? Great.

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1                   Hear it says, it provides high radial strength  
2     without compromising flexibility or uniform scaffolding.

3                   Could you explain what in the Tristar provides  
4     high radial strength?

5     A.     It's identical to the fundamental Palmaz and NIR,  
6     that the radial strength comes from the -- what they  
7     are calling the corrugated ring or the Palmaz ring.

8                   MR. TIMMONS: If we could just focus in on  
9     the stent... Big screen. Thank you.

10    BY MR. TIMMONS:

11    Q.     How is the -- how are all three ACS stents  
12    manufactured?

13    A.     They're manufactured by starting with a stainless  
14    steel tube, and removing material from that. In this  
15    case, the material is removed by a laser process.

16    Q.     How are the -- how is the embodiment in the '762  
17    patent made?

18    A.     The preferred embodiment of the '762 is identical.  
19    You start with a stainless steel tube and you remove  
20    material from that stainless steel tube.

21    Q.     The commercial embodiments of the Palmaz/Schatz and  
22    Palmaz stents, how are they made?

23    A.     Again, identical. Starting with a stainless steel  
24    tube and removing material from the stainless steel tube  
25    to create the pattern that you see.

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1 Q. Are there any differences between the way that the  
2 Tristar is made and the way that the NIR stent is  
3 manufactured?

4 A. Yes. The NIR is manufactured starting with a flat  
5 sheet. You cut that pattern in the flat sheet and roll it  
6 up. In order to get the mechanical properties that you  
7 need, they're welded together. And as a result, you don't  
8 have -- in this product you don't have any weld points to  
9 worry about. And also we had talked about some of the U  
10 connectors that would spring back a little bit after being  
11 formed, and they potentially would protrude off of the  
12 surface a little bit.

13 We don't have any similar kind of U connectors  
14 or any protruding surfaces on the ACS design.

15 Q. So the lack of U's protruding and the lack of welds  
16 on the Tristar stent and the other ACS stents, does that  
17 have any effect at all on your infringement analysis of  
18 Claim 23?

19 A. Particularly as compared to the NIR analysis, it  
20 makes it a much more straightforward analysis to do,  
21 because you don't have to worry about, you know, whether  
22 or not the weld is important, whether or not the U is  
23 projecting off a little bit more. Everything made here  
24 is from the stainless steel tube and all on one  
25 cylindrical claim.

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1 Q. Let's turn to Claim 23. I will ask for PX-3, which  
2 is in evidence.

3 During the liability phase, we looked at the  
4 NIR stent in two different ways. First, as each segment  
5 being the tubular member and then the stent as a whole  
6 being a tubular member.

7 Can we do that for the ACS stents also?

8 A. Absolutely. Analysis can be done identically.

9 Q. Do you have an opinion as to whether or not the ACS  
10 Multi-Link Duet stents and Tristar stents infringe Claim  
11 23 of the '762 patent?

12 A. I have an opinion. And that's that they do, indeed,  
13 infringe.

14 Q. That's true whether you look at the Tristar or any  
15 of the ACS stents as a whole or each as a corrugated  
16 individual ring?

17 A. That's right. Either way of looking at it, my  
18 conclusion is the same.

19 Q. Let's turn to each of the individual claim elements.  
20 And the first one is expandable intraluminal vascular  
21 graft, comprising. Are the ACS stents an expandable  
22 intraluminal vascular graft?

23 A. Absolutely. They're marketed and sold that way as  
24 stents.

25 Q. That's another way of saying stent?

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1 A. Absolutely. (Absolutely above)

2 Q. Next element. A thin-walled tubular member having  
3 first and second ends. And let's focus in on thin-walled  
4 first.

5 Do the ACS stents satisfy the thin-walled  
6 requirement?

7 A. Certainly. When you look at the thin-walled  
8 requirement, the wall has little extent from one side to  
9 another. The purpose of that is to allow it to be  
10 balloon expandable, what we've talked about before. In  
11 this case, the stent is certainly balloon expandable and  
12 the material thickness is on the order of 5-1/2 thousandths  
13 of an inch, which is obviously quite small.

14 Q. Dr. Collins, we've placed on the left-hand side the  
15 Court's definition. And do you understand that the --  
16 that definition of thin-walled requires that it be  
17 thin-walled to both its first and second diameters?

18 A. Yes.

19 Q. The ACS stents, are they thin-walled, first and  
20 second diameters?

21 A. Yes. The wall, it's difficult to see it when you  
22 look at the stent as a whole, but when you expand it from  
23 the first diameter to the second diameter, the material  
24 does not change. The material's thickness stays the same.

25 Q. That's true for both the corrugated ring and the

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1 stent as a whole?

2 A. Absolutely, yes.

3 Q. The second part of this element is tubular member.

4 Do the ACS stents meet this claim definition?

5 A. Yes, they do. Again, you can look at it either as

6 the stent as a whole or each one of the Palmaz rings or

7 corrugated rings being a tubular member. That they're

8 hollow, elongated, cylindrical structure with two ends.

9 And you look at it as the stent as a whole, there's

10 absolutely no question but that it's elongated. It's much

11 longer than it is in diameter. But when you look at each

12 one of the ring elements, there are some designs, like the

13 Multi-Link, in which the length of the ring element is a

14 little bit shorter than its diameter, where for the Duet

15 and Tristar, it is a little bit longer than its diameter.

16 Q. Let's recap for a second.

17 So when you look at the stent as a whole, it

18 meets the tubular member element literally?

19 A. Exactly. Absolutely.

20 Q. And if these individual rings are elongated, also --

21 A. Correct.

22 Q. Let's talk about the situations where this ring is

23 not elongated.

24 A. Okay.

25 Q. Do you have an opinion as to whether or not that

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1 non-elongated corrugated ring as an equivalent of an  
2 elongated tubular member?

3 A. Absolutely. The reason, from an engineering  
4 perspective in particular, what matters is that you have  
5 a slot and that slot is longer than it is wide and whether  
6 or not the whole ring happens to be a little bit more, a  
7 little bit less than a ratio of one, it does not matter  
8 at all.

9 Q. During the liability phase of this case, we talked  
10 about a very similar analysis of the NIR stent. We went  
11 through the function, way and result of an elongated  
12 tubular member under the '762 patent.

13 In your opinion, do the corrugated rings of  
14 the Multi-Link or the ACS stents, are they the equivalent  
15 of an elongated tubular member?

16 A. Yes, they are, in that they provide the same  
17 function, do it in the same way and give you the same  
18 result.

19 Q. Is -- what is -- do the individual rings of the ACS  
20 stents expand and support tissue whether or not they're  
21 elongated?

22 A. Absolutely.

23 Q. Is that the identical function to the Palmaz/Schatz?  
24 The Palmaz tubular member, if it's elongated?

25 A. That's correct.



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1 Q. Do the corrugated rings of the ACS stents perform  
2 this function in the same way as a tubular member of the  
3 '762 patent?

4 A. Yes, they do. And again the way this expands is the  
5 balloon will start to push the stent out. The bars or  
6 struts bend and they plastically deform as they expand in  
7 diameter, and the surgeon is allowed to control that  
8 expansion, and there's no springiness in that process  
9 because of the plastic deformation process.

10 Q. And the corrugated rings of the -- of the ACS stents  
11 that aren't elongated, do they achieve the same result as  
12 the elongated tubular member of the '762 patent?

13 A. Absolutely. They provide uniform support to the  
14 tissue wall and they do it in a way that allows a surgeon  
15 to control what the final diameter is. Once it's reached  
16 that final diameter, it stays where the surgeon wants it.

17 Q. So, in your opinion, does the -- do the ACS stents  
18 meet the thin-walled tubular member having first and  
19 second ends as claim element?

20 A. Absolutely, yes.

21 Q. Let's turn to the next claim element: A wall surface  
22 disposed between the first and second ends.

23 Do the ACS stents meet this definition?

24 A. Most definitely. Here, the definition is that the  
25 outer surface of the tubular member must be disposed in a

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1 common cylindrical plane. Well, you start with a cylinder  
2 and then material is removed from that cylinder. So you  
3 don't have to worry about bumps or anything else. This  
4 is a very straight cylinder from which material is removed  
5 and certainly meets that -- that definition exactly.

6 Q. The lack of U's and welds, does that have any effect  
7 in your analysis of this claim element?

8 A. Basically, I think it makes the analysis much more  
9 straightforward and much simpler thing to look at.

10 Q. So it's -- it's simpler than the NIR analysis?

11 A. Much more simpler than the NIR analysis, correct.

12 Q. The next claim element is a wall surface having a  
13 substantially uniform thickness.

14 Do the ACS stents meet this claim element,  
15 whether or not we look at them as corrugated rings or  
16 as a stent as a whole?

17 A. Absolutely. Again, you start with a stainless  
18 steel tube. These tubes are made of medical grade metal.  
19 In the manufacturing process, their wall thicknesses are  
20 very carefully controlled. And then material is removed  
21 from that, etching out the pattern, which leaves you with  
22 a uniform wall. You look at multiple rings, they're all  
23 made from the same tube, so they all have the same uniform  
24 wall thickness.

25 Q. What has to have a substantially uniform thickness,

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1 just to be clear?

2 A. If you will, the struts, the struts are what -- are  
3 the metal that make up the stent, and they have to be of  
4 uniform thickness.

5 Q. That's the metal that basically surrounds the slots?

6 A. That's correct.

7 Q. And directing you again to the Court's definition,  
8 it's requires that the wall surface be substantially  
9 uniform, both at its first and second diameters.

10 Is the material surrounding the slots the  
11 same thickness in both the first and second diameters,  
12 once the ACS stents are expanded?

13 - - -

14 A. Absolutely. As the stent expands, the wall thickness,  
15 material does not change. You can see that, from the first  
16 diameter to the second diameter, it stays the same.

17 Q. Let's go on to the next claim element, which is a  
18 plurality of slots formed therein.

19 In your opinion, does the ACS stent meet the  
20 plurality of slots claim?

21 A. Absolutely. You can see there are a number of slots  
22 as you go around the circumference. The Palmaz ring, it's  
23 made up of slots, multiple slots.

24 - - -

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2 A. (Continuing) And certainly as you start to couple  
3 multiple rings together, there are just more slots.

4 Q. And you talked earlier about how the stents are  
5 formed. Do these stents -- does the manufacturing  
6 process of the ACS process comply with the --

7 A. Absolutely. They do it in an identical way as the  
8 preferred embodiment.

9 MR. TIMMONS: The next element, please.

10 BY MR. TIMMONS:

11 Q. Are the slots disposed substantially parallel to  
12 the longitudinal axis of the tubular member?

13 A. They certainly are. The easiest way is probably  
14 looking at the blowup. You can see the orientation of a  
15 slot, which is along the axis of the stent.

16 Q. And does that geometry have any importance as to how  
17 the stent works?

18 A. It's absolutely critical to the functioning. It  
19 provides the space for the stents to open up and  
20 plastically deform.

21 Q. Is that anything like the coil stents we talked  
22 about during the liability phase?

23 A. No. It's 180 degrees literally from the coil stents  
24 where the openings are perpendicular to the axis. It's  
25 identical to the Palmaz ring design.

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1 Q. Just a couple more elements. The next one is the  
2 tubular member have a first diameter. Do the ACS stents  
3 meet that first element?

4 A. They have a first diameter which allows it to be  
5 delivered to the site.

6 Q. A second diameter?

7 A. Yes. Second diameter is expanded and deformed  
8 diameter. When you apply a pressure from the balloon, it  
9 opens it up, plastically deforming the walls and generating  
10 a larger deformed diameter.

11 Q. And the very last element in Claim 23 requires that  
12 the outside of the wall surface of the tubular member be  
13 smooth in the first diameter.

14 Do the ACS stents meet this claim element?

15 A. Absolutely. You are starting with a smooth stainless  
16 steel tube and you are just removing material from it. So  
17 it is.

18 Q. Again, U's not protruding or no U's at all and the  
19 welds. Does that make any difference?

20 A. It makes the analysis that much more straightforward  
21 to do.

22 Q. It means to you that this is a smooth surface?

23 A. Smooth surface. No question.

24 Q. Just to sum up, what's your opinion as to whether  
25 or not the ACS stents meet Claim 23 of the '762 patent?

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1 A. I think we've gone through each one. I've had no  
2 question but each of those stents meet all of the claim  
3 elements in Claim 23.

4 Q. Let's turn to something a little bit new, and I just  
5 want to talk to you a little bit about BSC's position on  
6 whether or not ACS meets these claim elements.

7 And do you understand that the -- that BSC and  
8 its experts assert that the -- each ring upon expansion is  
9 a little bit flaring at the end of those rings?

10 A. Yes, I do understand that.

11 Q. Does this position have any effect in your  
12 infringement analysis of Claim 23?

13 A. No. I've looked at it and I believe it has  
14 absolutely no impact at all in any of the claim elements.  
15 Therefore, it has no impact on my decision.

16 Q. Let's look at this flaring, and it's in PX-276 at  
17 Page 344 in the orange book. Focusing on the top.

18 Can you explain what we're seeing here?

19 A. Sure. This is a -- an ACS, a Multi-Link stent,  
20 which is expanded to its second or expanded diameter.  
21 And the flaring that you're talking about is probably  
22 best seen by looking at the ends. And, again, it's always  
23 hard to look at a three-dimensional product like this in  
24 the two-dimensional image and really have a sense.

25 But if you look at, for example, that part of

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1 the ring, you can see it appears to be canting out a  
2 little bit. You can see an element out here that's can't  
3 go out a little bit, and that's the flaring you're  
4 referring to.

5 Q. Is that the Multi-Link stent?

6 A. Yes.

7 MR. TIMMONS: Can we do a split-screen? What  
8 we're going to do is put up one of the pictures that Dr.  
9 Snyder has attached to his expert report.

10 (Pause while counsel conferred.)

11 MR. TIMMONS: Is it all right, your Honor?  
12 There's no objection.

13 Flip it around, so we can be in the same  
14 orientation.

15 BY MR. TIMMONS:

16 Q. Tell me what's shown in this picture from Dr. Snyder.

17 A. This is a stent that I understand was implanted in a  
18 pig artery, a non-diseased pig artery, and then excised  
19 and cleaned up in and a picture was taken of it.

20 Q. Is this also a Multi-Link stent?

21 A. Yes.

22 Q. Do you understand that the ACS stents may flare  
23 upon expansion?

24 A. Sure. Yes.

25 Q. What, if anything, are factors that may control

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1 the amount that it flares upon expansion?

2 A. There are a number of design parameters and expansion  
3 rates, but equally important is the -- are the conditions  
4 under which it's expanded. You can imagine if it's  
5 expanded in air, and I don't know for a fact, but I  
6 believe the one on the left was expanded in air. There's  
7 no force on the outside which is going to tend to push  
8 these struts back onto the surface.

9 If you go to the extreme and expand it in a  
10 very rigid vessel, you're going to be squeezing the stent  
11 up against the wall and it's going to conform to the  
12 balloon much more carefully.

13 Or an intermediate position, where you've  
14 got some resistance, where you will have from a healthy  
15 pig tissue that's going to tend to keep the flaring to a  
16 minimum.

17 Q. To the extent -- can you explain the differences  
18 between expanding the stent in a healthy artery and a  
19 diseased artery?

20 A. As an engineer, the differences I will be looking  
21 at are what are the external forces in the geometry that  
22 you are expanding into. So if you are expanding into a  
23 perfectly uniform geometry, a constant -- constant  
24 material characteristics, you'll get one result. If you  
25 are expanding into something which is highly not uniform



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1 and highly not rigid, basically, the idea is to have the  
2 stent conform to that tissue wall in its expanded stent.

3 So you get a very different result, depending  
4 on the nature of the tissue into which you are expanding  
5 the stent.

6 Q. No matter the extent of flaring in these stents upon  
7 expansion, does it have any effect at all on your analysis  
8 of the infringement of Claim 23 by the ACS stents?

9 A. No, because it does not impact any of the claim  
10 elements in Claim 23.

11 Q. We are going to go back very shortly to the claim  
12 elements and what we've done is taken Judge Robinson's  
13 instructions from the liability phase. I would like to  
14 run through a couple of those claim elements that do  
15 talk about second diameters.

16 And the first one -- I've gone through these  
17 and highlighted places where it talks about first and  
18 second diameter. First one is thin-walled. We talked  
19 about that a little bit already. You understand that the  
20 Court's definition requires that it be thin-walled in both  
21 the first and second diameter?

22 A. Yes, I do.

23 Q. Even in spite of this flaring, are the ACS stents  
24 still thin-walled in the second diameter?

25 A. Certainly. Material thickness does not change from

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1 its first diameter to second diameter. It's thin-walled  
2 to begin with.

3 Q. Does the flaring have any effect on your analysis  
4 that the ACS stents meet this claim element?

5 A. No, it does not impact it at all.

6 Q. The second one we've called out is substantially  
7 uniform thickness. That requires that it be at both the  
8 first and second diameters.

9 And we talked about that it was a thickness of  
10 a material that surrounds the slots. Does that thickness  
11 change when the stent expands?

12 A. No. It stays the same going from the first diameter  
13 to the second diameter.

14 Q. The way I understand it, Dr. Snyder measured the  
15 distance at the end of the ring flares off the surface --

16 MR. BRENEISEN: Your Honor, objection. This  
17 has been quite a bit of leading testimony and I think he  
18 should ask the witness a straight question.

19 THE COURT: It is leading. Rephrase.

20 BY MR. TIMMONS:

21 Q. How do you understand that Dr. Snyder analyzed the  
22 substantially uniform thickness of the ACS stents?

23 A. Well, what I understand he did was he took one  
24 stent, which was implanted in a pig artery, and measured  
25 the height of that stent, or the elements of the stent off

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1 of a hypothetical plane. So basically he was measuring  
2 heights and not measuring thicknesses at all.

3 Q. Do you have any problem with his particular  
4 measurements of that height?

5 A. No. I'm sure that the analytical techniques that he  
6 used in the lab were perfectly reasonable and acceptable,  
7 but certainly to characterize one test from a pig as a  
8 representative sample for what would happen in human  
9 condition would be a stretch, and I don't know that he's  
10 making that claim, but I certainly would not support it.

11 Q. Was that pig artery diseased or non-diseased?

12 A. My understanding is it was non-diseased.

13 Q. For the purposes of this analysis, I'm going to ask  
14 you to accept Dr. Snyder's methodology. Can you do that?

15 A. Sure.

16 Q. Does the flaring that Dr. Snyder found have any  
17 relevance to your infringement analysis?

18 A. No. It really does not. Again, it does not impact  
19 any of the claim elements.

20 Q. Does the measurement that Dr. Snyder did have  
21 anything to do with substantially uniform thickness as  
22 claimed in Claim 23 of the '762 patent?

23 A. No, it doesn't.

24 Q. Why not?

25 A. Again, what he measured was the height, the

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1 thickness of the material is the thickness of the -- the  
2 stainless steel tube at the beginning, and that does not  
3 change.

4 Q. Do the ACS stents meet the claim elements of  
5 substantially uniform thickness, despite the flaring?

6 A. Absolutely.

7 Q. We're done with the Court's definition, but I would  
8 like to turn back to the claim for one second. I will  
9 focus you in on a claim element that a -- the tubular  
10 member having a second, expanded and deformed diameter.  
11 Is this consistent with how you understand the ACS stents  
12 are expanded?

13 A. Yes.

14 Q. Is there anything in this claim element that  
15 concludes or requires flaring?

16 A. No. Not at all.

17 Q. And does the ACS stent, upon expansion, even though  
18 it flares, meet that claim element?

19 A. Yes, it does.

20 Q. And let's turn to wall surface, the Court's  
21 definition of that.

22 The outer surface of the tubular member must  
23 be disposed in a common cylindrical plane.

24 Does that definition address second diameter?

25 A. No, it does not.

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1 Q. Is that definition consistent of your understanding  
2 of how stents work?

3 A. Absolutely. Start with the stent and it's in its  
4 deliverable form. You bring it to a lesion site and then  
5 you expand it. You know, the concept of having a second  
6 diameter in a human, which is a perfect -- perfect cylinder,  
7 you know, I'm sure it's happened at one point because of  
8 probability, but I can't imagine it's happened more than  
9 once.

10 Q. So this definition reflects the reality?

11 A. Absolutely.

12 Q. I understand BSC may argue there must be a wall  
13 surface in a common cylindrical plane in the second  
14 diameter in addition to the first diameter. I want you  
15 to assume that they're correct for this analysis. Can  
16 you do that?

17 A. Yes.

18 Q. Under that assumption do the ACS stents still meet  
19 claim element wall surface?

20 A. It very well could, depending on the extent of  
21 flaring, because, again, nothing is ever perfect, and even  
22 though a common cylindrical plane, it does not mean that  
23 one molecule might be off or not. So I have not seen data  
24 that really quantifies the amount of flaring. I could  
25 believe that the flaring will be some larger and some

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1 smaller, depending on the operating conditions.

2 Q. Do you have an opinion as to whether or not the ACS  
3 stents with flaring may be the equivalent of a wall  
4 surface where the outer surface of a tubular member must  
5 be disposed in a common cylindrical plane in a second  
6 diameter?

7 A. Absolutely. The purpose is to uniformly expand and  
8 support the tissue wall so it does not collapse and it's  
9 identical.

10 Q. Is that the function of the wall surface?

11 A. Yes.

12 Q. Does the wall surface of the ACS stents perform that  
13 function, whether or not they are disposed in a common  
14 cylindrical plane upon expansion?

15 A. Absolutely, yes.

16 Q. What is the way that the wall surface with a  
17 substantially uniform thickness of the '762 patent  
18 performs that function?

19 A. Well, it does it by expanding uniformly and it  
20 expands uniformly because it has a uniform wall thickness  
21 and again it expands uniformly.

22 Q. Does the wall surface of the ACS stents perform  
23 this function in the same way?

24 A. It certainly does, yes.

25 Q. What is the result of the wall surface of the '762

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1 patent?

2 A. The result is the result that we talked about with  
3 the Palmaz ring. You get something that can be expanded,  
4 plastically deformed to the diameter that the surgeon  
5 wants and it's no longer elastic wants it gets there. And  
6 it provides uniform support for the tissue wall.

7 Q. Finally, does the wall surface achieve the same  
8 result?

9 A. Absolutely.

10 Q. In the ACS stents?

11 Do all of the ACS stents have a wall surface  
12 that meet the claim element, despite not being in a common  
13 cylindrical plane upon expansion?

14 A. Yes. That's not required and, yes, it's not  
15 required.

16 Q. One more topic. You understand that in the damages  
17 phase we're talking about what stents that are on the  
18 market infringe the '762 patent as noninfringing  
19 alternatives?

20 A. That's my understanding, yes.

21 Q. Can I show you PX-3699 that's in evidence? Mr.  
22 Croce described as illustrating the successful competitors  
23 of Cordis in the stent market. I want to run through  
24 these.

25 An AVE stents infringe Claim 23 of the '762

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1 patent?

2 A. Yes.

3 Q. BSC stents, NIR stent, infringe Claim 23 of the  
4 '762 patent?

5 A. Yes.

6 Q. As we've talked today, ACS, Multi-Link, Tristar,  
7 infringe Claim 23 of the '762?

8 A. Yes, they do.

9 MR. TIMMONS: Nothing further.

10 THE COURT: All right. Cross-examination? Mr.  
11 Breneisen?

12 MR. BRENEISEN: Thank you, your Honor.

13 Good afternoon, ladies and gentlemen.

14 CROSS-EXAMINATION

15 BY MR. BRENEISEN:

16 Q. Good afternoon, Doctor.

17 A. Good afternoon.

18 Q. Dr. Collins, I understood your testimony earlier that  
19 you did not take any issue with Dr. Snyder's methodology  
20 and his testing of stents?

21 A. I didn't take any issue with Dr. Snyder having a  
22 stent and doing an accurate measurement of a stent on a  
23 mandril in terms of the heights of the various elements.  
24 I'm sure that was done accurately. I'm not sure, but  
25 I'm confident.



1 - VOLUME P -  
2 IN THE UNITED STATES DISTRICT COURT  
3 IN AND FOR THE DISTRICT OF DELAWARE  
4  
5 CORDIS CORPORATION, : CIVIL ACTION  
6 :  
7 Plaintiff :  
8 :  
9 vs. :  
10 :  
11 MEDTRONIC AVE, INC., et al., :  
12 :  
13 Defendants : NO. 97-550 (SLR)  
14 - - - - -  
15 MEDTRONIC AVE, INC., : CIVIL ACTION  
16 :  
17 Plaintiff :  
18 :  
19 vs. :  
20 :  
21 CORDIS CORPORATION, et al., :  
22 :  
23 Defendants : NO. 97-700 (SLR)  
24 - - - - -  
25 CORDIS CORPORATION, : CIVIL ACTION  
26 :  
27 Plaintiff :  
28 :  
29 vs. :  
30 :  
31 BOSTON SCIENTIFIC CORPORATION, :  
32 et al., :  
33 :  
34 Defendants : NO. 98-197 (SLR)  
35 - - - - -  
36  
37 Wilmington, Delaware  
38 Tuesday, December 19, 2000  
39 9:00 o'clock, a.m.  
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41 - - - - -  
42  
43 BEFORE: HONORABLE SUE L. ROBINSON, Chief Judge, and a jury  
44  
45 - - - - -  
46  
47 Official Court Reporters

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1 determined by the metal that's in that serpentine, where  
2 the connector does not have any impact on it at all.

3 MR. TIMMONS: If we can go to the bottom of  
4 the page on the left-hand side...

5 Pull up the paragraph under Figure 1.1, please.

6 BY MR. TIMMONS:

7 Q. The description of the Multi-Link Tristar says that  
8 it provides high radial strength in the second-to-last  
9 line there. Could you describe for me what in the ACS  
10 stents provide high radial strength?

11 A. Just as we described before, the strength comes  
12 from the Palmaz ring. In this case, they're calling it  
13 the corrugated ring.

14 Q. Let's turn to another subject, and that's  
15 manufacturing.

16 During the liability phase of this case,  
17 we've heard a lot of testimony about how the manufacturing  
18 of the AVE stent, the fact that it was made from bent  
19 wire, differentiated it from what we call slotted tube  
20 designs.

21 Is that an issue for the ACS stents?

22 A. No, not at all. The ACS stents are actually  
23 fabricated by starting with a piece of stainless steel  
24 tubing, and the pattern is cut into that stainless steel  
25 tubing to form the final product.

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1 words have to be in his report.

2 MR. UNDERHILL: Even the concept, your Honor.

3 THE COURT: Even the concept? Well, this is  
4 an expert. I'm not going to go that far, Mr. Underhill.  
5 You can answer the question.

6 BY MR. TIMMONS:

7 Q. Let me rephrase it. Dr. Collins, what is your  
8 understanding of how AVE describes the ACS stents?

9 A. That it's a -- a slotted tube stent in the  
10 marketing parlance that we had talked about before.

11 Q. If we could go back to the orange book, PX-276, at  
12 Page 5. And, again, let's go back to stent design.

13 A. Mm-hmm.

14 Q. How does ACS describe how the stents are made?

15 A. As I was indicating, that under stent design, it's  
16 laser cut from a stainless steel tube in the exact  
17 corrugated ring pattern as the ACS. So the Tristar is,  
18 you start with a stainless steel tube, and then you use  
19 a laser to cut a pattern, and that pattern produces the  
20 pictures that you had seen just previously.

21 Q. Is that true also for the Duet and Multi-Link?

22 A. Yes. Yes. Absolutely.

23 Q. How does this laser cutting from the stainless steel  
24 tube compare to the manufacturing process that is disclosed  
25 as the preferred embodiment in the '762 patent?

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1 A. It's identical to what was disclosed in the patent.

2 Q. And this manufacturing process for the ACS stents,  
3 how does that compare to the way that Cordis manufactured  
4 the Palmaz/Schatz stent?

5 A. Also identical.

6 Q. How are the AVE stents made?

7 A. The AVE stents are made starting with rod stock,  
8 solid material, from which a ring is fabricated, and that  
9 ring is then formed into a Palmaz ring by creating the  
10 serpentine and then multiple rings are assembled together  
11 using the laser fusion process to create a connector  
12 between the rings.

13 Q. Let's focus in on a little bit on that connector or  
14 the weld. And I'd like to direct your attention to  
15 PX-3257, which are pictures of the GFX stent and that's in  
16 evidence.

17 MR. TIMMONS: May I approach, your Honor?

18 THE COURT: Yes, you may.

19 (Mr. Timmons handed an exhibit to the witness.)

20 BY MR. TIMMONS:

21 Q. And we've put a picture of the GFX stent, a closeup,  
22 on two of the segments on the screen.

23 Let's focus in on that weld. Tell me about  
24 the weld and what the geometry is of the stent.

25 A. Sure. You can see the weld in this region right

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1 you start with a cylinder, and then you remove material  
2 from that cylinder. So, certainly, the materials that  
3 are left remain on the common cylindrical plane.

4 Q. And the fact that the ACS stents don't have the  
5 weld like the GFX, does that have any effect on your  
6 analysis of this particular claim element?

7 A. Once again, it's another issue. You don't have to  
8 worry about it. It makes things that much more  
9 straightforward to analyze.

10 Q. Let's go on to next claim element, a wall surface  
11 having a substantially uniform thickness. Do the ACS  
12 stents meet this definition?

13 A. Yes, they do. Again, going back to the fact that  
14 it's fabricated from a thin-walled tube, which has a  
15 uniform wall thickness removing material, everywhere the  
16 wall thickness remains the same, which is the wall  
17 thickness of the initial tube.

18 Q. And the Court's definition of substantially uniform  
19 thickness requires that substantially uniform thickness  
20 be both at its first and second diameters. Is that true  
21 of the ACS stents?

22 A. Absolutely true. Again, when you expand it, you're  
23 just bending the metal. You're not changing the thickness  
24 of the metal.

25 Q. What has to have substantially uniform thickness under

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1 this claim?

2 A. It is the metal itself. It's the struts. That's what  
3 the stent is.

4 Q. Let's go on to the next claim element, which is  
5 plurality of slots formed therein. Plurality of slots.

6 Do the ACS stents meet this claim element,  
7 plurality of slots?

8 A. Definitely. It's more than one slot and a slot is  
9 long narrow opening. You can see here, here's a slot cut  
10 two in and you go around the circumference of any one  
11 element and you'll see there are multiple slots. Certainly,  
12 then, as you replicate those ring portions, you'll have  
13 more and more slots.

14 Q. And the second part of this requires that the slots  
15 must be formed in the wall surface of the tubular member  
16 as by the removal of the material.

17 Do the A -- are the ACS stents formed that way?

18 A. Absolutely. You start with a cylinder and you remove  
19 the material from the wall.

20 Q. Next claim element is slots disposed substantially  
21 parallel to the longitudinal axis of the tubular member.

22 Do the ACS stents meet this claim --

23 A. Yes. You can look at any of the slots. Take that  
24 one as an example. You can see its axis runs in that  
25 direction, which is parallel to the axis of the stent.